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# Simulates male rat for 2 weeks using rat study protocol (6 hr/day 5
days/week)
# Uses metabolism constants from Redo of the MCMC in vitro with flux

#Set the working directory to where you downloaded the scripts
setwd(dirname(parent.frame(2)$ofile))

# Load libraries needed to run scenario
library(deSolve)

# Model path and name
mName <- "chloroprene.model"

#Load model inits file for the ode solver
source(paste0(mName, "_inits.R"))

#Load the model dll
dyn.load(paste0(mName, .Platform$dynlib.ext))

#Scenario specific values
tstart <- 0.0
tstop <- 336.0
times <- seq(tstart, tstop , by=0.01)

#Physiological parameters path
#Load the parameters
source('./params/Rat.R')
source('./states.R')

*****#
*****#
#Simulation specific metabolism parameters
parms ["VMAXC"] <- 7.30    # Liver
parms ["KM"] <- 0.040

parms ["VMAXCLU"] <- 0.    # Lung
parms ["KMLU"] <- 1.0
parms ["KFLUC"] <- 0.092

parms ["VMAXCKid"] <- 0.024  # Kidney
parms ["KMKD"] <- 0.075
parms ["KFKIC"] <- 0.0
*****#
*****#

#Timing variables for forcing functions
dstart <- tstart
dlength <- 6      #hours per day to expose
ddaysperwk <- 5   #days of week to expose
dexpend <- 12     #days of exposure
parms ["TSTOP"] <- tstop

#Source forcing functions

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#This loads the function forcing() in the namespace
source("forfunc.R")

#Scenario Specific Exposure
parms["CONC"]<- 12.3

ppm <- c(12.8, 32.0, 80.0)
cinh1 <- data.frame(ppm)
cinh <- lapply(cinh1, as.numeric)
outlist <- list()
ppm2 <- list()

for(i in 1:nrow(cinh1)){
  parms["CONC"] <- cinh1[i,]

  {
    out <-ode(Y, times, func = "derivs", parms = parms, method="vode",
    atol=1.0e-10, rtol=1.0e-8,
              dllname = mName, initforc="initforc", forcings=forcings,
    initfunc = "initmod", nout = length(Outputs),
              fcontrol=list(method="linear"), outnames = Outputs)

    }
    outlist[[i]] <- out[33601,]
  }
frout1 <- data.frame(outlist)
dout <- data.frame(t(frout1), row.names=paste(1:3))
rout <- cbind(dout[,c(21,22,23,24)])
#displays the output
"Female Mouse MCMC Redo"
rout

#unload the model dll
dyn.unload(paste0(mName, .Platform$dynlib.ext))

```